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ABSTRACT

To understand the developmental bases of moral-rational behavior in children, the effectiveness of four training paradigms in modifying social behavior was compared. The specific behavior studied was that of taking-turns in situations where mutual assistance was necessary in order for either of two children to receive prizes. The four training paradigms were: (1) reinforcement treatment--children took turns in helping each other get prizes, the reward being one child received a prize on each trial, as well as verbal approval; (2) modeling treatment--children observed adult models taking-turns in getting prizes; (3) rule conformity treatment--the experimenter labeled turn-taking, explained how to take-turns, and instructed the children to take-turns; and (4) the cooperation treatment--this emphasized "No one gets prizes unless you help each other" and "If you take-turns, you will both get prizes." The subject were 69 matched pairs of 4- or 5-year-old children randomly selected for five two-person games during four experimental sessions on four days. The effectiveness of the training was measured by the degree to which it was transferred to new situations. Analysis of the data collected show that teaching a concept of cooperation (prizes can be obtained only by taking turns) was the only method that consistently led to more cooperative interaction in new situations. (DB)

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MODIFICATION OF SOCIAL INTERACTION IN FIVE-YEAR-OLDS: A COMPARISON OF TRAINING PARADIGMS BASED ON REINFORCEMENT, MODELING, RULE CONFORMITY, OR COOPERATION[1]

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MODIFICATION OF SOCIAL INTERACTION IN FIVE-YEAR-OLDS: A COMPARISON OF TRAINING PARADIGMS BASED ON REINFORCEMENT, MODELING, RULE CONFORMITY, OR COOPERATION[1]

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At least four basic processes have been hypothesized by psychologists to account for the development of moral-rational social behavior in the child. The reinforcement of socially appropriate behavior by adults and the punishment of inappropriate behavior is, of course, one of these processes. Another basic process is modeling. In modeling the child acquires social responses on the basis of his imitation of adults.

The third basic process, rule conformity, involves acceptance of a rule on the basis of convention or authority and the capacity to govern behavior in accordance with the rule. Rule conforming behavior is a-rational and inflexible and involves learning a somewhat arbitrary connection between a stimulus condition and a rule. The basis for this connection between a stimulus and acting according to a rule is heteronomous. The fourth possible basis for moral-rational social behavior is cooperation. Cooperation requires the acquisition of a principle for rational adjustment to social situations. It involves a sensitivity to the desirability of mutual assistance in certain social situations. Cooperation, as defined here, may involve conformity to rules; but in this case the conformity is autonomously based. That is, in cooperation there is a reason for conforming that is inherent to the interpersonal situation. When cooperation involves a rule, the connection between stimulus and rule is far from arbitrary.

Previous investigations of the developmental bases of moral-rational behavior have utilized case study methods (Peck, Havighurst, Cooper, Libienthal, and More, 1960), or interviews about hypothetical events (Piaget, 1932; Kohlberg, 1963b), or inquiries into the childrearing techniques used by parents (see Kohlberg, 1963a, for a review). Peck, Piaget, and Kohlberg seem to agree in general that the bases for moral behavior change during development in their relative importance in the following sequence: reinforcement, rule conformity, and rationality-cooperation.

Another approach to the study of the developmental bases of moral-rational behavior is to investigate the responsiveness of children to behavior modification. Chittenden (1942) found that a group of preschool children were more cooperative than controls in their play with other children following a series of training sessions in which the examiner and each child analyzed the "play" of dolls in social interactions and discussed appropriate social responses. It cannot be determined from this study whether the basis for learning cooperative behavior was reinforcement, rule conformity, an understanding of cooperation, or some combination of these. Bandura and McDonald (1963) found that modeling was more effective in changing the moral judgments of five- to eleven-year-olds than was social approval. Crowley (1968) found that labeling and rewarding appropriate moral judgments in training sessions for first graders resulted in their making more appropriate judgments than untrained controls when tested 18 days later. A group whose training involved discussion of the basis for labeling judgments as appropriate (also given labeling and reward) showed no more change than the labeling-reward group.

The present study was a further attempt to understand the developmental bases of moral-rational behavior by investigating the effectiveness of various training paradigms. The behavior studied was that of taking-turns in situations where mutual assistance was necessary in order for either of two children to receive prizes. The measuring instruments were two-person games in which only one child could get a prize on each trial. Moral-rational behavior in these games would involve taking-turns helping each other get prizes. If each child attempted to get a prize for himself on every trial, neither child would get any prizes.

Four training paradigms were compared. In the reinforcement treatment the children received prizes for cooperating. The children were instructed to behave such that they took turns in helping each other get prizes. This behavior was rewarded in that one child received a prize on each trial. The E also expressed verbal approval after every trial. The modeling treatment involved having the children observe adult models taking-turns in getting prizes. The rule conformity treatment involved labeling taking-turns and bringing about practice of the behavior by explaining how to take-turns and telling the children to take-turns. This could be considered a reinforcement plus labeling condition. The cooperation treatment involved labeling taking-turns and identifying taking-turns as a solution for the limited reward problem. Cooperation training emphasized "No one gets prizes unless you help each other;" and "If you take-turns, you will both get prizes." Only in cooperation training was a reason for taking-turns pointed out to the children.

The most interesting measure of the effectiveness of training concerns the degree to which training transfers to new situations. It might be

expected that training based on cooperation would transfer to new situations better than the other methods of training. This would be expected because children trained to take-turns on the basis of cooperation should be more responsive to the relevant cues for taking-turns, and they should connect this cue with taking-turns as a rational solution. This prediction assumes that five-year-olds have the cognitive mediational capacity to recognize a rather complex cue and to assimilate the taking-turns schema. The observations of Piaget (1932) seem to suggest that five-year-olds do not have this capacity. The present experiment provides evidence relevant to this question and in general yields information concerning the advantages of training social behavior on a conceptual basis to five-year-olds.

Various theorists (for example, Bandura & Walters, 1963) have suggested that modeling is a particularly important process in the learning of social behavior by young children. The present experiment investigated the usefulness of modeling as a training technique compared to simple reinforcement, training of a rule, and training of a concept.

Method

Subjects

Children from eight Extended Day Children's Centers in Los Angeles County were matched on the basis of sex, race, and age into 69 pairs. At each center the pairs were randomly selected for training treatments. The number of pairs and the mean age of children in each condition is reported in Table 1.

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INSERT TABLE 1 ABOUT HERE

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All of the children were four or five years old. Except for the modeling condition, pairs from four or five of the centers were represented in every condition. The modeling group had pairs from only two centers. There were 10 Negro pairs and 59 Caucasian pairs; and there were 36 all boy pairs, 29 all girl pairs, and four boy-girl pairs. The representation of pairs by race and sex was reasonably the same in all conditions. Careful inspection of the results suggested that there existed no significant differences attributable to race or sex among pairs.

The Games

Each of the five games listed below is a two-person game which requires mutual assistance for solution. In each game the players have conflicting goals. For every trial there is only one prize which is given to the person whose goal is reached. Since it is impossible to reach either goal without mutual assistance, no prizes are obtained on trials in which Ss fail to cooperate in the allotted time. For all of the games, the rational solution is for the Ss to take-turns in helping one another get prizes from one trial to the next.

1. Choice game. There are two spots on a board. Each spot is a goal for one S. The prize goes to the S whose goal is first touched simultaneously by the index finger of both Ss. There is a ten-second limit per trial.

2. Marble-pull Game. (Madsen paper in preparation,)

3. Cooperation Board Game. (Nelson & Madsen, 1968.)

4. Circle-matrix Game. (Kagan & Madsen, 1968.)

5. Pull-block Game. This game is similar to the Cooperation Game developed by the present authors (Madsen, 1967). The Pull-block Game involves

pulling ropes through a small square opening. There are two ropes each with two plastic cubes attached to them. A prize is given to the S pulling his rope completely through the opening first. Because of the closeness of fit in pulling a block through the opening, it is impossible to pull either rope completely through the opening if both Ss pull at once. Cooperative interaction is required in order for an S to pull his rope through the opening within the 20-second limit.

Procedure

All pairs of children in the four training conditions participated in four experimental sessions on four days. The first three sessions were on consecutive days and the fourth session was seven days after the third session. The E for the third and fourth sessions was a different person than the E for sessions one and two. A description of the four experimental sessions follows.

I. First Session.

A. Practice in taking-turns.

1. Reinforcement group. Each child was given six marbles, and the pair was told that all of the marbles were to be put into a box. Child One was told to put a marble in a hole in the top of the box, then Child Two was told to put a marble in the hole, and then Child One was told to put another marble in the box, etc. The children alternated in this fashion until each had placed six marbles in the box. After each child responded, the E said "Good." The same procedure was followed as the pairs alternated in placing X's in 12 squares on a sheet of paper when given only one marking pen. The

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same procedure was again followed as the children threw one available ball at a target box six times each.

2. Modeling group. Pairs of children watched a male and female E taking-turns in the above situations.[2]

3. Rule conformity group. This treatment was the same as for the reinforcement group, except the children were repeatedly told that they were taking-turns.

4. Cooperation group. This treatment was the same as for the rule conformity group, except the E explained several times the reason for taking-turns, e.g., "There is only one pen, so how can both of you mark X's?" "You are taking-turns so that you both will have a chance."

B. Choice game.

Immediately after the taking-turns practice just described, every pair in the training conditions played the choice game. The game was explained in the same way to all pairs, and there were eight trials with eight plastic bugs as prizes for all conditions. After the explanation of the game, the procedure varied depending on the condition as follows:

1. Reinforcement group. E told the children where to point their fingers on the first and second trials, forcing them to take-turns in getting prizes. Thereafter, E asked "Where will you point next?" E continued to direct the action such that the Ss took-turns for eight trials. After every trial E said "Good" and gave a prize to one of the pair.

2. Modeling group. E said "Watch how we play the game." A male and female E took-turns getting prizes for eight trials while the Ss watched. After each trial, E asked "Who gets the prize?" This was to assure that the Ss were paying attention and understood the game. After finishing the game, E gave four prizes to each child "...for helping us with these games."

3. Rule conformity group. This treatment was the same as for the reinforcement group, except E repeatedly labeled whose turn it had been and whose turn it was to be. Before the first trial E said "I want you to take-turns getting prizes." After each trial E asked "Whose turn is it to get a prize now?" and said "You are taking-turns getting prizes."

4. Cooperation group. After explaining the game, E said "Go" for the first trial with no further comments. After each of the first three trials E said "S One (name) touched this spot and S Two (name) touched this spot, so S (or so no one) gets a prize." Then E said either "S helped S get a prize" or "See what happens if you don't help each other?..no one gets prizes." After trials four through eight, E made one or all of the following statements: "No one gets prizes unless you help each other." "If you take-turns, you will both get prizes." "Whose turn should it be now?"

II. Second Session.

A. Marble pull game. There were six testing trials followed by six trials with training. The instructions and procedure for the test

trials were the same for all training groups and for control group I. The procedure for the six training trials varied depending on the condition and was essentially the same training procedure for each condition as described above for the choice game. The control group I was given no further instructions or training for trials 1-12. The 12 prizes were marbles.

B. Cooperation board game. The procedure was the same as for the marble pull game. There were four testing trials followed by four trials with training. Control group I played for eight trials with no training. There were eight different prizes (rings, plastic toys, whistles, etc.).

III. Third session.[3]

All of the training groups and control group II played the circle matrix game for eight trials. The procedure was the same for all groups. Although this was the third day of participation for the training groups, none of the Ss had seen the E before, since he was a different person than the E for the previous sessions. This new E had only the names of pairs he was to test, and he did not know to which conditions the pairs had been assigned. The eight prizes were different from one another and different from those previously used.

IV. Fourth Session.[3]

The training groups and control group II played the pull-block game for eight trials. This session occurred seven days following session III and the E was the same as for the third session. All groups were tested in the same way, and the E was still ignorant as to the assignment of pairs into conditions. Eight new and different prizes were used.

Results

The data was collected during sessions II, III, and IV. The first half of trials of the marble pull game and of the cooperation board game were testing trials, and all eight trials of the circle matrix game and of the pull-block game were for the purpose of measuring cooperative behavior and comparing groups. When a member of a pair tested during the second session was absent from school for the third or forth session, the data from the second session was used in the analysis of results even though no data from that pair was available from sessions III or IV. Thus no data actually obtained was excluded from the analysis. The only exception to this rule was the exclusion of data from three pairs, each from a different condition, in which one or both children refused to obey instructions or to play a game.

Marble pull. The amount of taking-turns on the marble pull game, as for the other games, may be represented by a score which is the number of prizes obtained by the S in a pair who obtained the fewest prizes over trials. Since there were six test trials with the marble pull game, a score of 3 means that both Ss received three prizes. A score of 2 means that one S got two prizes and the other S got either two, three, or four prizes. Although the taking-turns score does not provide any information about the sequence of getting prizes, it is a good measure of the degree to which Ss interacted by helping each other get prizes. For one S to get the first three prizes is "taking-turns" to the same degree as to alternate in getting prizes from one trial to the next. Because cooperation was required in order for anyone to get any prizes, the "taking-turns" measure is sensitive to the amount of cooperation

as well as sharing over trials. A high score, then, means high in cooperation and sharing.

The mean taking-turns scores for each training group and for the control group is reported in Table 2. An analysis of variance showed that the dif-

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ference between groups was significant at the .05 level, $F(4,51)=3.63$. A Newman-Keuls test suggested that the cooperation group differed significantly at the .05 level from each of the other four groups and that no other differences were significant at the .05 level. Children whose training on the first day was based on principles of cooperation were more cooperative in their interaction in a new situation on the second day than were children trained by other methods. Furthermore, unlike cooperative training, the other training methods did not increase cooperative interaction above the level for the untrained control group.

Cooperation Board Game. For this game there are two measures of cooperation. In addition to the taking-turns measure, time to solution on each trial is of interest. The time limit for a trial was 30 seconds, but Ss who were fully cooperating with one another could easily complete the trial in three or four seconds. The more competitive and conflicting the interaction, the longer the time to solution. Table 3 reports the mean taking-turns scores and the mean times to solution for each group.

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INSERT TABLE 3 ABOUT HERE

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The analysis of variance on taking-turns scores suggests nonsignificant differences at the .05 level, $F(4,51)=.91$. However, the hypotheses made *a priori* as well as the results on the marble pull game give some justification for a separate comparison of the cooperation group with the other groups. The difference between the cooperation group and the control group is significant only at the .10 level, $F(1,51)=3.3$.

The results for the time to solution measure are in close agreement with the taking-turns results; however, the analysis of variance on time to solution scores suggests more significance in the differences between groups. Although the main effect is not significant at the .05 level, $F(4,51)=1.77$, a comparison between the cooperation group and the control group shows this difference to be significant at the .05 level, $F(1,51)=5.0$. A comparison between the cooperation group and the other three training groups considered together also suggests a significant difference at the .05 level, $F(1,51)=4.3$.

Taken together, the results from the two measures suggest that the pairs who had received training based on a concept of cooperation were more cooperative on the cooperation board than the other groups.

Circle Matrix Game. The measure of cooperation for this game is the taking-turns score. These scores are listed by condition in Table 4.

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INSERT TABLE 4 ABOUT HERE

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An analysis of variance did not find a significant difference between the five groups at the .05 level, $F(4,49)=1.5$. The results from the two previous games

justify comparisons between the cooperation groups and the other groups. The difference between the cooperation group and the control group is significant at the .05 level, $F(1,49)=5.2$. The difference between the cooperation group and the other three training groups considered together is also significant at the .05 level, $F(1,49)=4.3$.

Thus, in a new situation following training on two previous days, only the cooperation group stands out as being more cooperative in a comparison of the groups.

Pull-Block Game. This was another game with a time limit for each trial; so time to solution scores as well as taking-turns scores are reported in Table 5. Considering first the taking-turns scores, the main effect of treatment

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is not significant at the .05 level, $F(4,40)=1.6$. However, the cooperation group differs significantly from the control group at the .05 level, $F(1,40)=5.1$. The difference between the cooperation group and the other three training groups considered together is significant only at the .10 level, $F(1,40)=3.0$.

The time to solution scores differ between groups significantly at the .05 level, $F(4,40)=3.2$. The cooperation group differs significantly from the other three training groups at the .05 level, $F(1,40)=7.0$.

As a whole, the results from the pull-block game imply that eight days after the final training session the children whose training emphasized conceptually a reason for cooperating were more cooperative than children who were either untrained or whose training was by other methods.

Discussion

Psychologists who have studied moral and social development would seem to suggest that behavioral change (socialization) for five-year-olds is almost exclusively the product of reinforcement contingencies, obedience to adult rules, and imitation of adult behavior (Bandura & Walters, 1963; Kohlberg, 1963; Piaget, 1932). This orientation is at least partially a consequence of viewing the five-year-old as a child whose conceptual and mediational capacities are severely limited. For example, the limited potential of the five-year-old for reversible thought is said to severely limit the child's capacity for cooperation (Piaget, 1932). To the degree that this view implies that conceptual training is futile with five-year-olds, the results of the experiment described here suggest that the five-year-old is not so handicapped conceptually as was thought. In fact, teaching a concept of cooperation (namely, prizes can be obtained only by taking-turns) was the only training method which consistently led to more cooperative interaction in new situations.

The interpretation of the results favored by the authors is that simply being reinforced for taking-turns, or simply observing models taking-turns, or simply learning a label for taking-turns while being reinforced for it was not sufficient training in taking-turns to result in transfer of the interaction pattern to new and somewhat different games. The five-year-olds in the cooperation group were, however, capable of learning the concept that prizes could be obtained only by taking-turns. This concept provided a basis for transfer of the taking-turns interaction to new games whenever the children recognized the new games as situations in which prizes could be obtained

only by taking-turns. The children in the other training conditions did not have a concept which connected their desire to get prizes with the strategy of taking-turns on games of the sort presented to them.

Unfortunately, at least one other interpretation of the results cannot be ruled out until further experiments are completed. It may be that cooperation training was most effective simply because the E exercised more authority and unintentionally showed himself to be more concerned for the cooperation group than for the other groups. It is true that the E made a greater number of comments to pairs in the cooperation group than to pairs in the other groups. Ss in the cooperation group, compared to other Ss, may have better understood and more strongly felt that the adult wanted them to take-turns. This interpretation will be tested by an experiment in which the rule conformity and cooperation groups are equated for the number and intensity of adult commands and comments which they experience. Tape recorded instructions will be used.

The present experiment was not designed to provide information about incremental learning effects which might have occurred in the course of being trained on various games. The children were trained on several games in order to increase the likelihood of transfer of training. The results do suggest that the first day of training was sufficient to result in significant differences between the cooperation group and the other groups when tested on the second day. Whether further training served to increase, or to actively maintain, or to have any effect at all on these differences cannot be determined.

Two other methodological limitations are important. It would have been desirable to have a control group in which Ss played all of the games, but without training. Such a control, however, would be difficult to distinguish from the reinforcement condition. Because the possibility of reinforcement is inherent to the games, playing the games at all entails some training.

Another methodological shortcoming was the failure to incorporate measures of learning other than the tests for transfer. It is of interest to know, for example, whether the training procedures for a given game resulted in any learning on that game. This is different from asking whether the training procedure affected behavior on a new and different game. Although all of these questions could not be answered in an exploratory study of the sort completed, future experiments might advantageously measure cooperative behavior before and after training on a given game in addition to testing for transfer with different games.

FOOTNOTES

1. The authors are indebted to Dr. Carolyn STern, Director of the UCLA Head Start Evaluation and REsearch Center for her continuing interest and helpful comments. Spencer Kagan made many constructive suggestions.

2. Harriet Braiker served as the female model in Treatment 2.

3. Edward Chaney helped in the testing in Sessions III and IV.

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Table 1

Mean Ages of Children by Treatment

	Controls					
	I	II	Reinforcement	Modeling	Rule Conformity	Cooperation
Number of Pairs	10	13	10	11	12	13
Mean Age in Months	62	63	60	62	62	60

Table 2

Taking-Turns Scores on Marble Pull:
Mean No. Prizes Obtained by Ss Getting Fewest Prizes During Six Trials

Control I N = 10	Reinforcement N = 10	Modeling N = 11	Rule Conformity N = 12	Cooperation N = 13
1.6	1.5	.8	1.1	2.5

Table 3

Taking-Turns Scores and Times to Solution Scores on Cooperation

	Control I N = 10	Reinforcement N = 10	Modeling N = 11	Rule Conformity N = 12	Cooperation N = 13
Mean number of prizes obtained by Ss getting fewest prizes during 4 trials	.7	1.0	.9	1.2	1.4
Mean times to solution in seconds	18	17	16	13	9

[1]N = Number of Pairs.

Table 4

Taking-Turns Scores on Circle Matrix Game: Mean Number of Prizes Obtained by Ss Getting Fewest Prizes During Eight Trials

Control II N[1] = 13	Reinforcement N = 9	Modeling N = 10	Rule Conformity N = 10	Cooperation N = 12
1.3	1.4	2.0	1.5	2.8

Table 5

Taking-Turns Scores and Times to Solution Scores on Pull-Block Game

	Control II N = 11	Reinforcement N = 8	Modeling N = 8	Rule Conformity N = 7	Cooperation N = 13
Mean number of prizes obtained by Ss getting fewest prizes during 8 trials	1.2	2.1	1.4	1.6	2.6
Mean times to solution in seconds	15	14	15	14	10

[1]N = Number of Pairs.